

What is claimed is:

1. A defrosting device comprising:

a defrosting heat exchange means at one side of an outdoor heat exchanger in a multi-type air conditioner that can cool or heat rooms, having one end connected to a pipeline for flow of high pressure gas refrigerant from a compressor, and the other end connected to a pipeline connected to one end of an outdoor heat exchanger in the multi-type air conditioner for flow of high pressure liquid refrigerant.

2. The defrosting device as claimed in claim 1, wherein the defrosting heat exchange means comprises;

a first guide pipeline having one end connected to a pipeline for flow of high pressure gas refrigerant, for guiding the high pressure gas refrigerant in a defrosting operation;

a defrosting heat exchanger having one end connected to the other end of the first guide pipeline; and

a second guide pipeline having one end connected to the other end of the defrosting heat exchanger, and the other end connected to the pipeline for flow of the high pressure liquid refrigerant.

3. The defrosting device as claimed in claim 2, wherein the first guide pipeline further comprises an electronic valve mounted thereon for controlling a flow rate of the refrigerant from the high pressure gas refrigerant pipeline in the defrosting operation.

4. The defrosting device as claimed in claim 3, further comprising:

a bypass pipe having one end connected to a pipeline in the multi-type air conditioner

for flow of low pressure gas refrigerant, and the other end connected to the first guide pipeline;

a three way valve on an intersection of the first bypass pipe and the first guide pipeline for converting a flow direction of the refrigerant according to an operation mode; and

an expansion means on the second guide pipeline for expanding refrigerant introduced into the pipeline for flow of the high pressure liquid refrigerant in defrosting operation,

thereby making the defrosting heat exchanger to serve as an evaporator together with the outdoor heat exchanger in a heating operation.

5. The defrosting device as claimed in claim 4, wherein the expansion means on the second guide pipeline is an electronic expansion valve.

6. The defrosting device as claimed in claim 3, further comprising:

a first bypass pipe having one end connected to a pipeline in the multi-type air conditioner for flow of low pressure gas refrigerant, and the other end connected to the first guide pipeline;

a first three way valve on an intersection of the first bypass pipe and the first guide pipeline for changing a flow direction of the refrigerant according to an operation mode;

a second bypass pipe having one end connected to a pipeline for flow of the high pressure liquid refrigerant, and the other end connected to the second guide pipeline; and

a second three way valve on an intersection of the second guide pipeline and the bypass pipe for changing a flow direction of the refrigerant according to the operation mode.

7. A multi-type air conditioner comprising:

an outdoor unit installed in an outdoor, comprising a compressor, a refrigerant flow controlling part connected to a discharge end of the compressor for guiding the refrigerant proper to operation conditions selectively, an outdoor heat exchanger connected to the refrigerant flow controlling part, a defrosting device at a side of the outdoor heat exchanger, and a piping system connected between the parts;

a plurality of indoor units each installed in a room and having an indoor heat exchanger and an electronic expansion valve having one end connected to one end of the indoor heat exchanger; and

a distributor between the outdoor unit and the indoor units for selectively guiding refrigerant from the outdoor unit to the plurality of indoor units proper to operation conditions, and guiding the refrigerant passed through the indoor units to the outdoor unit again,

wherein the piping system comprises;

a first connection pipeline connected to a discharge end of the compressor and has the other end connected to the distributor, and the refrigerant flow controlling part and the outdoor heat exchanger mounted between the ends in succession, a second connection pipeline connected to the first connection pipeline which is connected between the refrigerant flow controlling part and the discharge end of the compressor for guiding compressed refrigerant to the distributor directly, and a third connection pipeline connected between a suction end of the compressor and the distributor having a branch pipeline connected to one end of the refrigerant flow controlling part, for guiding low pressure gas refrigerant to the compressor.

8. The multi-type air conditioner as claimed in claim 7, wherein the refrigerant flow

controlling part is a four way valve for selective guidance of the refrigerant from the compressor to the outdoor heat exchanger or the distributor proper to operation condition.

9. The multi-type air conditioner as claimed in claim 7, wherein the distributor comprises;

a guide piping system for guiding the refrigerant introduced thereto through the first connection pipeline or the second connection pipeline in the outdoor unit to the indoor units, and the refrigerant from the indoor units to the first connection pipeline or to the third connection pipeline in the outdoor unit, and

a valve bank on the guide piping system for controlling refrigerant flow such that the refrigerant flows in/out of the indoor units, selectively.

10. The multi-type air conditioner as claimed in claim 9, wherein the guide piping system comprises;

a high pressure liquid refrigerant connection pipeline having one end connected to the first connection pipeline in the outdoor unit,

high pressure liquid refrigerant branch pipelines having one ends branched from the high pressure liquid refrigerant connection pipeline as many as a number of the indoor units and the other ends connected to the other ends of the indoor electronic expansion valves respectively,

a high pressure gas refrigerant connection pipeline having one end connected to the second connection pipeline in the outdoor unit directly,

high pressure gas refrigerant branch pipelines having one ends branched from the high pressure gas refrigerant connection pipeline as many as the number of the indoor units,

and the other ends directly connected to the other ends of the indoor heat exchangers of respective indoor units respectively,

a low pressure gas refrigerant connection pipeline having one end connected to the third connection pipeline in the outdoor unit directly, and

a low pressure gas refrigerant branch pipelines having one ends branched from the low pressure gas refrigerant connection pipeline as many as the number of indoor units, and the other ends connected to the other ends of the indoor heat exchangers of the respective indoor units the high pressure gas refrigerant branch pipelines connected thereto, respectively.

11. The multi-type air conditioner as claimed in claim 10, wherein the valve bank comprises;

selection valves on the high pressure gas refrigerant branch pipelines and the low pressure gas refrigerant branch pipelines for closing the valves on the high pressure gas refrigerant branch pipelines and opening the valves on the low pressure gas refrigerant branch pipelines in a case of room cooling, and opening/closing the valves in an opposite manner in a case of room heating, for controlling refrigerant flow.

12. The multi-type air conditioner as claimed in claim 7, wherein the defrosting device has one end connected to the second connection pipeline, and the other end connected to a first connection pipeline between the distributor and the outdoor heat exchanger.

13. The multi-type air conditioner as claimed in claim 12, wherein the defrosting device comprises;

a first guide pipeline having one end connected to the second connection pipeline for

guiding refrigerant from the second connection pipeline,

a defrosting heat exchanger having one end connected to the other end of the first guide pipeline; and

a second guide pipeline having one end connected to the other end of the defrosting heat exchanger, and the other end connected to the first connection pipeline between the distributor and the outdoor heat exchanger.

14. The multi-type air conditioner as claimed in claim 13, wherein the defrosting device further comprises an electronic valve on the first guide pipeline for controlling a flow rate of the refrigerant from the second connection pipeline.

15. The multi-type air conditioner as claimed in claim 14, wherein the operation condition comprises;

a first mode for cooling all rooms,

a second mode for cooling a major number of rooms and heating a minor number of rooms,

a third mode for heating all rooms,

a fourth mode for heating a major number of rooms and cooling a minor number of rooms,

a fifth mode for making an operation for defrosting from the outdoor heat exchanger at the same time with the third mode operation, and

a sixth mode for making an operation for defrosting from the outdoor heat exchanger at the same time with the fourth mode operation.

16. The multi-type air conditioner as claimed in claim 14, wherein the outdoor unit further comprises;

a check valve on the first connection pipeline between the distributor and the outdoor heat exchanger for passing refrigerant from the outdoor unit toward the distributor in the first or second mode operation, and

a heating parallel expansion pipe having a refrigerant expansion element in parallel to the check valve for guiding refrigerant introduced from the distributor through the first connection pipeline to the outdoor heat exchanger in the third to sixth mode operation.

17. The multi-type air conditioner as claimed in claim 16, wherein the second guide pipeline is connected to the first connection pipeline between the heating parallel expansion pipe and the distributor.

18. The multi-type air conditioner as claimed in claim 17, wherein the defrosting device further comprises;

a bypass pipe having one end connected to a first connection pipeline between the four way valve and the outdoor heat exchanger, and the other end connected to the first guide pipeline;

a three way valve on an intersection of the first bypass pipe and the first guide pipeline for converting a flow direction of the refrigerant according to an operation mode; and

an expansion means on the second guide pipeline for expanding refrigerant introduced from the distributor,

thereby making the defrosting heat exchanger to serve as an evaporator together with the outdoor heat exchanger in the third or fourth mode.

19. The multi-type air conditioner as claimed in claim 18, wherein the refrigerant expansion means on the second guide pipeline is an electronic expansion valve.

20. The multi-type air conditioner as claimed in claim 17, wherein the defrosting device further comprises;

a first bypass pipe having one end connected to a first connection pipeline connected between the four way valve and the outdoor heat exchanger, and the other end connected to the first guide pipeline,

a first three way valve on an intersection of the first bypass pipe and the first guide pipeline for changing a flow direction of the refrigerant according to an operation mode,

a second bypass pipe having one end connected to a first connection pipeline between the outdoor heat exchanger and the heating parallel expansion pipe, and the other end connected to the second guide pipeline, and

a second three way valve on an intersection of the second guide pipeline and the bypass pipe for changing a flow direction of the refrigerant according to the operation mode,

thereby making the defrosting heat exchanger to serve as an evaporator together with the outdoor heat exchanger in the third or fourth mode.

21. The multi-type air conditioner as claimed in claim 7, wherein the outdoor unit further comprises an outdoor fan at a side of the outdoor heat exchanger.

22. The multi-type air conditioner as claimed in claim 13, wherein the outdoor unit further comprises an outdoor fan at a side of the outdoor heat exchanger.



23. The multi-type air conditioner as claimed in claim 22, wherein the outdoor fan blows air from a side of the defrosting heat exchanger to a side of the outdoor heat exchanger.

24. A multi-type air conditioner comprising:

an outdoor unit installed in an outdoor, comprising a compressor, a four way valve connected to a discharge end of the compressor for guiding the refrigerant proper to operation conditions selectively, an outdoor heat exchanger connected to the four way valve, a defrosting device having a defrosting heat exchanger at a side of the outdoor heat exchanger, a piping system connected between the parts, and an outdoor fan at one side of the outdoor heat exchanger for blowing air from a side of the defrosting heat exchanger to a side of the outdoor heat exchanger;

a plurality of indoor units each installed in a room and having an indoor heat exchanger and an electronic expansion valve having one end connected to one end of the indoor heat exchanger; and

a distributor between the outdoor unit and the indoor units for selectively guiding refrigerant from the outdoor unit to the plurality of indoor units proper to operation conditions, and guiding the refrigerant passed through the indoor units to the outdoor unit again,

wherein the piping system comprises;

a first connection pipeline connected to a discharge end of the compressor and has the other end connected to the distributor, and the four way valve and the outdoor heat exchanger mounted between the ends in succession, a second connection pipeline having one end connected to the first connection pipeline which is connected between the four way valve and the compressor for guiding the refrigerant from the compressor to the distributor directly, a

third connection pipeline connected between a suction end of the compressor and the distributor having a branch pipeline connected to one end of the four way valve, for guiding low pressure gas refrigerant to the compressor, a first guide pipeline having one end connected to the second connection pipeline, the other end connected to the defrosting heat exchanger, and an electronic valve for controlling a flow rate of the refrigerant from the second connection pipeline, and a second guide pipeline having one end connected to the defrosting heat exchanger, and the other end connected to the first connection pipeline between the distributor and the outdoor heat exchanger.

25. The multi-type air conditioner as claimed in claim 14, wherein the outdoor unit further comprises;

a check valve on the first connection pipeline between the distributor and the outdoor heat exchanger for passing refrigerant from the outdoor unit toward the distributor in cases all rooms are cooled, or a major number of rooms are cooled and a minor number of rooms are heated, and

a heating parallel expansion pipe having a refrigerant expansion element in parallel to the check valve for guiding refrigerant introduced from the distributor through the first connection pipeline to the outdoor heat exchanger in cases all rooms are heated, or a major number of rooms are heated and a minor number of rooms are cooled.

26. The multi-type air conditioner as claimed in claim 25, wherein the second guide pipeline is connected to the first connection pipeline between the heating parallel expansion pipe and the distributor.

27. The multi-type air conditioner as claimed in claim 26, wherein the piping system further comprises;

a first bypass pipe having one end connected to a first connection pipeline connected between the four way valve and the outdoor heat exchanger, and the other end connected to the first guide pipeline,

a first three way valve on an intersection of the first bypass pipe and the first guide pipeline for changing a flow direction of the refrigerant according to an operation mode,

a second bypass pipe having one end connected to a first connection pipeline between the outdoor heat exchanger and the heating parallel expansion pipe, and the other end connected to the second guide pipeline, and

a second three way valve on an intersection of the second guide pipeline and the bypass pipe for changing a flow direction of the refrigerant according to the operation mode.

thereby making the defrosting heat exchanger to serve as an evaporator together with the outdoor heat exchanger in an operation mode of heating all rooms, or heating a major number of rooms and cooling a minor number of rooms.

28. The multi-type air conditioner as claimed in claim 27, wherein the outdoor fan blows air from a side of the defrosting heat exchanger to a side of the outdoor heat exchanger.